arrayed such that polarization directions thereof are periodically opposite and intersect those of the first magnets. The linear motor further includes an electromagnetic coil disposed to oppose the magnet array to generate a Lorentz force in cooperation with the magnet array and a yoke integrated with the coil at a first side opposite to a second side of the coil disposed opposite to the magnet array. --

IN THE SPECIFICATION:

Please amend the specification as follows:

Please substitute the paragraph beginning at page 1, line 7, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- The present invention relates to a linear motor suitably used as, e.g., a driving source for a stage apparatus mounted on an exposure apparatus or the like for the manufacture of a semiconductor device or the like, and a stage apparatus, an exposure apparatus, and a device manufacturing method using the same. --

Please substitute the paragraph beginning at page 1, line 15, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Fig. 12 shows the arrangement of the permanent magnets of a linear motor according to one prior art device. Fig. 12 shows only one of two permanent magnet groups opposing each other through a holding member 7. Permanent magnets 110a and 110b alternately arrayed on the

holding member 7 have a non-rectangular parallelepiped shape with corners being cut off. The permanent magnets 110a and 110b are arrayed such that their magnetisms (N and S poles) are alternately opposite. Also, the thicknesses and widths of the permanent magnets 110a and 110b are so adjusted as to generate an ideal sine wave magnetic field in a space between opposing yokes and the permanent magnet groups. --

Please substitute the paragraph beginning at page 2, line 1, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- According to the above prior art arrangement, to make the sine wave magnetic field generate an ideal sine wave, the thicknesses and widths of the permanent magnets must locally differ. As the entire shape of each magnet is not a simple rectangular parallelepiped, each permanent magnet is difficult to fabricate with high precision, leading to a high cost. This problem has not been solved yet. The obtained magnetic field density is lower than that obtained with a rectangular parallelepiped permanent magnet, and the driving force of the linear motor is accordingly decreased. --

Please substitute the paragraph beginning at page 2, line 26, and ending on page 3, line 9, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- In order to achieve the above object, a linear motor according to the present invention comprises first magnets arrayed such that polarization directions thereof are periodically opposite, second magnets arrayed adjacent to the first magnets such that polarization directions thereof are periodically opposite, and an electromagnetic coil opposing the first and second magnets to generate the Lorentz force by at least the first and second magnets, the second magnets being disposed such that the polarization directions thereof intersect those of the first magnets. --

Please substitute the paragraph beginning at page 3, line 21, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Preferably, either on of the first and second magnets, which is disposed at a terminal end, has a volume less than those of the other magnets. --

Please substitute the paragraph beginning at page 6, line 12, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Fig. 12 is a partial perspective view showing a linear motor stator according to the prior art. --

Please substitute the paragraph beginning at page 6, line 19, and ending on page 7, line 10, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Fig. 1 shows an embodiment of the invention. In this linear motor M, a first permanent magnet group of first magnets 1a to 1d are arrayed in the x-axis direction and integrally connected on a holding member 7. The first permanent magnet group has the first magnets 1a and 1c arrayed such that their polarization directions are periodically opposite, and the second magnets 1b and 1d arrayed adjacent to the first magnets 1a and 1c such that their polarization directions are periodically opposite. A second permanent magnet group is arrayed on the other side of the holding member 7. A linear motor movable element 10 is thus formed. In the same manner as the first permanent magnet group, the second permanent magnet group has third magnets 5a and 5c arrayed such that their polarization directions are periodically opposite, and fourth magnets 5b and 5d arrayed adjacent to the third magnets 5a and 5c such that their polarization directions are periodically opposite. --

Please substitute the paragraph beginning at page 10, line 1, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- When a current is supplied to the two-phase coils, that is, the first and second coils, simultaneously, the total thrust is:

$$F = F1 + F2$$

$$= K \cdot B(I1 \cdot \sin(2\pi/a) + (I2 \cdot \cos(2\pi x/a)). \text{ --}$$

Please substitute the paragraph beginning at page 11, line 14, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Since the coils opposing the permanent magnets 1a to 1d are the electromagnetic coils 2a and 2b, the thrust is:

$$F = 2 \cdot K \cdot B \cdot I. \text{ --}$$

Please substitute the paragraph beginning at page 11, line 24, and ending on page 12, line 1, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- In this manner, when a current is supplied to multi-phase coils placed in a sine wave magnetic field or an approximately sine wave magnetic field, the thrust becomes constant or almost constant, so an excellent linear motor with a small thrust ripple can be obtained. --

Please substitute the paragraph beginning at page 13, line 21, and ending on page 14, line 9, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Fig. 7 shows the second modification. Three permanent magnets 1f to 1h located at the terminal end side have smaller sizes in the x-axis direction and smaller volumes than those of the remaining permanent magnets 1a to 1d. When the sizes in the x-axis direction of the permanent magnets 1f to 1h at the terminal end are gradually decreased, i.e., 15 mm for the permanent magnet 1f, 10 mm for the permanent magnet 1g, and 5 mm for the permanent magnet 1h, the y component of the magnetic flux density generated by this permanent magnet group becomes very close to a sine wave. For example, even at the terminal end of the linear motor movable element 10, the error with respect to the ideal sine wave can be decreased to be as small as 2% or less of the amplitude of the sine wave. --

Please substitute the paragraph beginning at page 14, line 25, and ending on page 15, line 15, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- Fig. 9 shows a semiconductor device manufacturing exposure apparatus having, as a wafer stage, a stage apparatus in which a linear motor M1 identical to that described above is used as the driving unit. A guide 52 and linear motor stator 21 are fixed on a surface plate 51. The linear motor stator 21 has multi-phase electromagnetic coils, and a linear motor movable

element 11 has a permanent magnet group, in the same manner as described above. The linear motor movable element 11 is connected as a movable portion 53 to a movable guide 54 serving as a stage. When the linear motor M1 is driven, the movable guide 54 is moved in a direction normal to the surface of the sheet of the drawing. The movable portion 53 is supported by a static pressure bearing 55 with reference to the upper surface of the surface plate 51 and by a static pressure bearing 56 with reference to the side surface of the guide 52. --

Please substitute the paragraph beginning at page 16, line 3, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

-- An embodiment of a device manufacturing method conducted by the above exposure apparatus will be described. Fig. 10 shows the flow of the manufacture of a semiconductor device (e.g., a semiconductor chip such as an IC or LSI, a liquid crystal panel, a CCD, or the like). In step 1 (design circuit), a semiconductor device circuit is designed. In step 2 (fabricate mask), a mask as the master with the designed circuit pattern is fabricated. In step 3 (manufacture wafer), a wafer is manufactured by using a material such as silicon. In step 4 (wafer process) called a pre-process, an actual circuit is formed on the wafer in accordance with lithography techniques using the exposure apparatus by using the prepared mask and wafer. Step 5 (assembly) called a post-process is the step of forming a semiconductor chip by using the wafer fabricated in step 4, and includes an assembly process (dicing and bonding) and a packaging process (chip encapsulation). In step 6 (inspection), inspections such as the operation